**A Contribution to Philosophy of Knowledge**

**Prelim**

*“...knowledge is rapport between the thought and reality,*

*and... the end of this rapport is the truth.” (P.G.* [*Horrigan*](http://www.horrigan.angelcities.com/knowledge.htm)*)*

The general notion of knowledge is obviously important and deserves to be addressed for the sake of establishing a useful point of view when thinking of any aspect of interest. Knowledge is discussed within numerous disciplines such as epistemology, gnoseology, psychology, and information sciences, to list just a few, as well as in philosophy, where its fundamental strata are contemplated. However, the definitions of knowledge promoted by these disciplines lead to rather involving and sometimes controversial derivations when applied to the basic concepts that become embedded in the roots of our understandings. Therefore we decided to bring a comprehensive discourse aiming to contribute to mitigation of ambiguities that are observed in the case of some principal scientific concepts. The major goal is to improve the clarity of the corresponding knowledge in terms of recording, sharing, application and growing. All these processes are impaired unless one can comprehend in a single term all that can be expressed in great detail about fundamental ideas. This is why the basic concepts such as mass, time, length, force, vector, frequency and dimension are introduced. They all belong to an important class of fundamental notions based on which we construct the scientific theories, test the validity of research hypotheses and make important conclusions and decisions. The point is that any misconception at that level triggers a chain reaction of misalignments. The significance of these concepts has prompted outstanding efforts exhibited by the scientific institutions attempting to improve the standards related to the chemophysical specifications of the units such as second, kilogram, kelvin, mole and metre, and to minimise the variability associated with relevant measures. Along with the chemophysical factors and numerical estimates, the critical agents for achieving better precision and accuracy are actualised in the form of pertinent descriptors – definitions and corresponding terms.

Knowledge recording is an underlying, backscatter reflection of knowledge. It is useful not only for knowledge maintenance, usage and sharing (learning), but also for reviewing of our understandings, for re-examination of established theories and the hypotheses proposed in the light of new evidence. Language, in particular the scientific nomenclature, presents one of the most pregnant carriers of the knowledge, yet the language is not the only mode used. The figures convey the meanings by the speed of magnetic waves, and so are the moving pictures (animations). Nevertheless, language poses as a principal translator of our ideas.

There are many languages, however, there are but a few doubts only about the importance of the English language in sciences, engineering and education. One of the important issues in this regard is the appearance of ambiguities that penetrate basic concepts in the scientific English vocabulary. There is a need for exploring the cases where these inconsistencies are evident, and this is especially important with respect to the fundamental concepts in scientific English language. The principal scientific terms are supposed to present the pillars of basic scientific disciplines. At this point it suffices to observe that there is increasing evidence about the damaging effects of English homonyms, synonyms and otherwise inconsistent terms in education, science, research, engineering and other applications of knowledge. Meaning can easily be lost due to the misalignment of terms.

It is important to highlight that this discourse addresses the selected fundamental terms in the scientific English exclusively. This is not an analysis of the general English vocabulary. The variations in common English language are beyond this analysis, however, it is worth pointing out that if the synonyms and homonyms would be simply eliminated from the general English language, the arts such as poetry and prose would be paralysed and crippled.

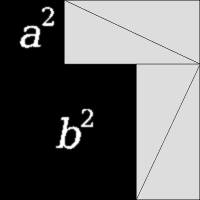
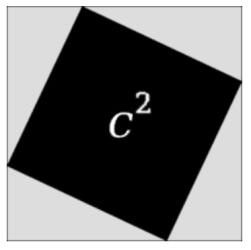
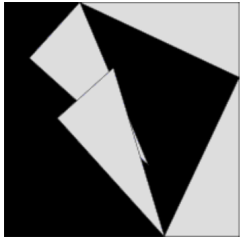
At the outset of this analysis it is educative to present a brief history of words. This will be followed by proposing generic models for defining the concepts, the relevant terms and knowledge itself. In continuation, a number of fundamental scientific concepts will be selected and diverse aspects associated with their ambiguity and variability discussed. These concepts and relevant terms will be used as examples in evaluating the phenomena of ambiguity, for presenting the diagnoses and suggesting the remedies. There are two aspects that will be addressed when discussing the selected principal scientific concepts:

1. What is ambiguous with regard to this concept, and
2. How this ambiguity can be mitigated.

Finally, several avenues where the advances in knowledge processing can be sought for are contemplated. An idea behind such an attempt is that, since our evolution and progress depend so heavily on our knowledge, there must be an interaction present. New knowledge views need to be probed to reflect appropriately an increase in the radii of observed horizons and magnifications.

A conscious effort was made to take advantage of sciences (epistemology, gnoseology, ontology, neuropsychology, neurophysiology, semantics, logics, linguistics, sociology, mathematics, [chemophysics](http://www.marxists.org/reference/subject/philosophy/works/us/bridgman.htm) and information sciences, to mention just a few).

Knowledge is undoubtedly one of the most important features of our species. The core concept of knowledge, however, is interpreted by differing sources in somewhat ambiguous and sometimes even contradicting ways. Even if we leave aside various religious interpretations that assign certain mystical immaterial attributes to knowledge, the scientific theories continue to present differing definitions. The obvious differences are for example in presentations that include in the definition of knowledge an aspect of belief, as opposed to variants where this component (belief) is not included. As another example, knowledge is in some instances characterised by the statement that it presupposes a presence of people who know. An opposing statement is that the knowledge can be recorded, and it continues to exist independently on the presence or absence of its creators. (This must not be confused with religious claims on the existence of a “Creator”).

Knowledge can be created, or learned from a record, but also from a demonstration. As an extreme example, we have learned some things from other species (bees, beavers, ants). We have learned from the bees about a very efficient model of group cooperation, and by observing the ants we formulated the ant colony optimisation algorithms. This is not to say that the complete definitions or theories were learned from bees or ants. What we have observed was at the level of data and patterns, and this was used to extend the existing theories. We have learned from the records made by Pythagoras (more than two thousand years ago) about the definitions that explain logical relations between the catheti and the hypotenuse of the right-angled triangle.

A [proof](http://en.wikipedia.org/wiki/Pythagora#Pythagorean_theorem) of the Pythagorean rule (see [animation](http://en.wikipedia.org/wiki/File:Pythag_anim.gif))

Contemporary information sciences include theories about the artificial intelligence and an automatic information search has become a common practice in applications of computers and the Internet. This implies that some form of knowledge can be processed without a direct presence of humans.

The above paragraphs are written with an intention to point at some aspects of the ambiguities associated with the concept of the knowledge itself. Bearing in mind the importance of this concept – the knowledge – there is a need to offer an option that can serve as a remedy to this situation. Based on such definition, in the following chapters this effort (to provide more transparent definitions) will be extended to some other fundamental concepts such as “data”, “information”, “relation”, “hypothesis” and “definition” itself. The common denominators for all listed concepts are that in each case there is evident a significant ambiguity.